410 Introduction

410.01 Description

The plans, specifications, and estimate (PS&E) are some of the documents required for the advertisement of a project.

The plans and contract provisions must set forth the work in a clear and concise manner to avoid misinterpretation.

The plans shall conform to the geometric design features specified in the design portion of the project file, see Section 330.06(2) of the Design Manual. All plan details and contract provisions are to be specifically applicable to the project being developed. It is acceptable to use details and provisions from previous contracts. They should, however, be examined closely, and modified as required, to ensure that they are specifically applicable to the current project.

Deviations from Washington State Department of Transportation (WSDOT) policies and standard practices require approval by the appropriate approving authority, in accordance with the Design Manual, in advance of advertisement of the project.

The Region and the Headquarters Bridge and Structures Office will coordinate design schedules, when structures are involved to ensure that the project will be completed in a timely manner.

410.02 Plan Preparation

The contents of this manual can be applied to the majority of the projects the designer will encounter. It is understood that no two projects are the same, and that it is impossible to provide information for every circumstance that may be encountered. There will be those projects, or portions of projects, that do not fit the standard applications. In these cases, the designer must be able to recognize the need to adjust the standards to best depict the work to be accomplished.

This manual is intended to show representative information and examples the designer can, and should, use as a basis to make decisions on what is required, what is to be included in the PS&E, and how it is to be shown in the plans. It should be understood that the main responsibility of the designer is to assemble a package that contains the precise information required by a contractor to submit a responsible bid and for WSDOT to get an acceptable finished product. Providing too much information can, at times, cause as many problems as not providing enough. The designer must remember that projects requiring contractor surveying will require more detail and information than a project being surveyed by WSDOT.

The designer is to take every opportunity to reduce the volume of the plans by using logical combinations of plan series to best display the information. Because there are no two projects exactly the same, the designer needs to examine the logical combinations of plan series for each project. Displaying too much information may cause confusion to the contractor bidding the project and could result in higher bid prices. Then again, a series of plan sheets with minimal information displayed on each sheet makes it difficult to determine the interrelationship of different items of work, which could also equate to increased prices by bidders estimating the project. A balance resulting in the complete and accurate information on the correct series of plan sheets is what is necessary.

The designer must remember that standards are not developed to stifle their ability to design, but instead to provide consistency across the state. We should be doing the same work the same way, regardless of where the project is located. Which means consistency of state standards should be followed whenever possible. When standard materials are called for, the contractors

and the suppliers know exactly what we're looking for and what to expect in the way of testing and approvals. When the same work is specified and represented in the plans the same way, the contractors know exactly what will be required and what will be acceptable. Using standard items and construction methods is almost always more economical. Proprietary items should be avoided if at all possible.

A tool available to the designer to ensure that required items are addressed during the PS&E preparation is the "PS&E Review Checklist", available on the WSDOT Internet/Intranet Home Page under the Project Development Branch. (http://www.wsdot.wa.gov/eesc/design/projectdev/) This checklist contains the type of information that will be examined during the Stewardship Process Review, conducted by Headquarters and FHWA at the end of the project.

420 The Project Manager's Responsibilities

All projects must have formal approval action in order to be advertised. See Figure 4-1 for "Approval for Ad Memorandum." See Advertisement and Award Manual for approval levels.

420.01 General

The project manager has the responsibility:

1. To prepare the PS&E in accordance with the approved design portion of the project file and in the format presented in this manual.

2. To obtain permits, approvals, clearances, and certifications for which the region is responsible. The PS&E shall reflect the requirements of these documents.

3. To provide and maintain accurate bid item quantities, reasonable unit prices, and backup data used to determine the estimated cost for lump sum bid items or other bid items that have little or no historical cost data.

4. To maintain the cost of the project within the budgeted amount. Request additional funds when through the course of a project it becomes apparent that adequate funds were not initially set up to either cover design or construction costs.

5. To assure that the aggregate total cost of state force work and state supplied materials are in accordance with RCW 47.28.030 and RCW 47.28.035. See Section 750.25.

6. To determine the sources for materials and locations of sundry sites furnished by WSDOT. To verify the quality and quantity of material available at the provided sources.

7. To verify that required new right of way will be secured prior to need.

8. To coordinate the Headquarters Bridge and Structures Office PS&E preparation with the Region PS&E preparation. To provide the Headquarters Bridge and Structures Office with design and bridge site data in a timely manner.

9. To ensure that reviews by the Region and the appropriate Headquarters offices have been completed. That the design team has returned a brief written response to all review comments, and that all appropriate changes have been incorporated into the PS&E prior to advertisement.

10. To coordinate activities and review for projects on National Forest System land per memorandum of understanding NFS 00-MU-11060000-040 *Between* State of Washington Department of Transportation *And* USDA Forest Service Pacific Northwest Region.

11. To provide a memorandum with written justification, to the Assistant State Design Engineer (ASDE), for the use of all proprietary items. See Section 750.16.

12. To provide a memorandum with written justification and estimated costs, to the Assistant State Design Engineer (ASDE), why it is in the public interest to use state furnished materials, state labor, a mandatory materials source, and/or a mandatory waste site. Federal Highway Administration (FHWA) approval is required on federal aid projects for Interstate New/Reconstruction. See Sections 740.03 & 750.25.

13. To coordinate with regional offices (Utilities engineer, Right of Way office) to obtain written construction permits and easements for work to be performed outside of WSDOT right of way.

14. To coordinate with regional permitting offices (Utilities engineer, R/W engineer, Highways and Local Programs, Environmental, etc.) to obtain all required agreements to perform work under the contract for governmental agencies, private companies and private individuals. These agreements shall include how the work is to be funded. There shall be substantiation that the benefit derived from the work is equal to or greater than the cost to WSDOT. Also to ensure that all local, state and federal regulations have been addressed for the project.

15. To provide justification and obtain approval from Headquarters Transportation Data Office (TDO) for liquidated damages including interim liquidated damages other than those specified in the Standard Specifications. See Section 750.11.

16. To provide justification and obtain approval from Headquarters Construction Administration for incentive/disincentive pay and liquidated damages that revises the Standard Specifications 1-08.9.

17. To provide justification for stockpiling materials for use on future construction contracts.

18. To provide justification for not using all pipe alternates.

19. To provide justification for the use of construction engineering percentages different from the percentages specified in Division 8.

20. To ensure that the project title matches the Capital Projects Reporting System title or obtain permission to change the title. When multiple State Routes are used in a title the smallest State Route number followed by et al. is used to shorten the title.

21. To provide justification and obtain approval from Headquarters Construction Administration for using nonstandard time for project completion specifications.

22. To provide justification and obtain approval from Headquarters Construction Administration or the delegated authority in each Region for all of Division 1 (with the exception of Section 1-04, 1-05 and 1-09 which Headquarters Construction has retained), for using project specific specifications that alters the Standard Specification for Road, Bridge, and Municipal Construction book and/or GSPs.

NOTE
Headquarters Construction desires to maintain consistency, accuracy, and legality with project specifications. That is why a project designer should always try to use specifications that are listed in the Standard Specifications for Road, Bridge and Municipal Construction Book – henceforth referred to as Standard Specification Book in these paragraphs. It is not uncommon for a project to have a method of work, or a working window of time that differs from those listed in the Standard Specification Book. There are also items of work that are Region specific and as such aren't covered in the Standard Specification Book. In those cases where there is a nonstandard item of work in a project, the designer may write a Project Specific Special Provision to describe the work. In the case of a Regional nonstandard item of work, the Region may write Region General Special Provisions (RGSPs) to describe the work. If these Project Specific Specifications or RGSPs change the content or wording of any specifications in Divisions 1 through 9 of the Standard Specifications Book, then approval must be given from Headquarters Construction or the delegated authority in each Region for all of Division 1 (with the exception of Section 1-04, 1-05 and 1-09 which Headquarters Construction has retained). In some cases Headquarters Materials must approve change to Division 9 before using Project Specific Specification or RGSP in a project.

Once a Region GSP has been approved by Headquarters Construction, it can then be used on future projects without being submitted to Headquarters Construction for approval again unless the Region GSP instructions state that approval is required for each project. However, Project Specific Special Provisions, when approved by Headquarters Construction, are only to be used in the project they were written for. They cannot be used on another project without acquiring Headquarters Construction's approval again. When referencing the Standard Specifications in the special provisions the headings from the Standard Specifications are never to be changed. When a section of the Standard Specifications is "Vacant" the designer is **not** to use these sections for their special provisions.

23. To ensure that the contract plans and specifications are stamped in accordance with WSDOT Executive Order E 1012.00, Certification of Documents by Licensed Professionals.

    It is essential that the Project Manager understands and ensures that no alterations to plans or specifications are made by anyone but the person who submitted the plans or specifications under their personal PE stamp and signature. This includes Headquarters Bridge and Structures, Traffic, Architecture, Landscape Architecture, Surveying or any other branch that certifies design with a professional stamp.

    The professional licensee who was directly responsible for the original documents shall certify all revisions to plans and specifications.

    Changes regarding quantities, payment estimates, and time lines are not considered technical changes. They therefore do not require certification by a PE. However, all changes in these areas shall be verified and documented by the original designer/submitter of that

item of work, and shall not be changed by the Project Manager without the specific permission of the original designer/submitter.

430 Headquarters Assistance/Review

430.01 General

Various offices of expertise are available for assistance if requested by the region. The following offices of Headquarters are available to assist during PS&E preparation:

Headquarters Real Estate Services Office
(MS 47338)

Headquarters Design Office
(MS47330)

Headquarters Hydraulics Branch
(MS47329)

Headquarters Project Development Branch
(MS47330)
Assistant State Design Engineers
Plans Liaison Engineers
EBASE /CREM Engineer
Wage Rates /GSP/Amendment Engineer

Headquarters Accommodation Branch
(MS47329)
Railroad Engineer
Utilities Engineer

Roadside Safety Engineer
(MS47329)

Roadside and Site Development
(MS47329)
Landscape Architect

Headquarters Bridges and Structures Office
(MS 47340)

The Transportation Supervising Architect
(MS47340)

Headquarters Traffic Operations Office
(MS47344)

Headquarters Materials Laboratory
(MS47365)

Headquarters Highway Maintenance Office
(MS47358)

Headquarters Construction Office
(MS47354)
Specifications GSP/Amendments Engineer

Headquarters Architectural Design and Construction Manager
(MS47328)

Headquarters Office of Equal Opportunity (OEO)
(MS47314)

The External Civil Rights Office will monitor the participation of the goals in projects. DBE goals (federally funded projects) are zero goals, the MWBE goals (state funded projects) are all voluntary goals and, if applicable, the number of training hours assigned for projects over $500,000 and 40 or more working days.

Headquarters Systems Analysis and Program Development
(MS47325)

Verification of program approval and funds available, fund authorization, and federal-aid project approval and authorization is obtained through this office. Federal Aid numbers are obtained from this office.

A transmittal letter stating the following is to accompany the review copies of the PS&E sent to the aforementioned office: See Appendix A3

1. Name and phone number of individual transmitting documents for review.

2. The date the review comments are due back to region.

3. The individual you want the review comments sent to (if not person listed in item no. 1 above).

4. The tentative project advertisement date.

440 Drafting Requirements

440.01 General

How the plan information is displayed on the plan sheets can have a great impact on the usefulness of the plans. To get the best possible bid and the best possible finished product, the plans must present the information clearly and concisely. Everyone who examines the plan should be able to easily determine what work is required and arrive at a single interpretation of the information.

To ensure a clear and singular interpretation, it is imperative that overcrowding of plan sheets is avoided by displaying only information relevant to the plan series, and that the plan be drawn with appropriate drafting standards as specified in this manual.

The designer will need to determine what information is required for the contractor to bid and construct the project, and for WSDOT to administer the project. Requirements of other readers such as FHWA and various Headquarter offices also need to be considered. Many of the requirements in this manual, such as begin and end Federal Aid number and section lines shown on the vicinity map, may not be required to construct or administer the project but have value to other users of the contract plans.

The designer also needs to determine what information does not add value and only serves to clutter up the plans and create confusion for the reader. Following are some examples of how to eliminate excess plan sheets or information that **should not be included in plan sheets:**

Right of Way lines that have no ties add no value. If Right of Way needs to be shown it should have ties showing where it is.

Future alignments that have nothing to do with construction of the project can often clutter up a plan sheet making it hard to find the needed information.

Showing existing pavement markings / edge of existing roadway on paving plans or pavement marking plans.

Showing anything that is slated for removal on a site prep plan anywhere else in the plans.

Repeating plan sheets just to keep the same number of sheets in each series. Use break lines to eliminate sheets of non-changing information. If there is no drainage code on a drainage plan sheet then the sheet shouldn't be included in the series. Also for paving plans and pavement marking plans, if nothing changes between intersections or interchanges, use break lines to eliminate sheets.

Detailing areas by shading or cross hachuring without showing any dimensions.

Profiles sheets showing overlay, grinding and inlay, or paving exception areas of the project add no value. Show only the portions of the project that have a change in the vertical alignment of the roadway under construction. The same way showing information already shown on roadway sections on paving plans without showing dimensions adds no value to the contract.

In general, if it does not provide needed information or add value to the plans …**DELETE IT!**

The designer, early in the design process, needs to give careful consideration to the different

series of plan sheets that will be required and the information that will need to be displayed on each series.

The use of different levels with the computer aided drafting and design (CADD) system allows the flexibility to provide additional series of plans quite easily and quickly if it turns out that there is more information required than originally anticipated. This is why it is important that all CADD work use the prescribed level scheme.

Most of the drawings created by CADD users in a design office are 11X17 plan sheets for PS&E. Therefore, references will pertain to that size unless otherwise noted. In general, the plotting scale for 11X17 plan sheets is 1 inch equals 100 feet (1"=100'), except as indicated below. This is done by setting the plotting scale in MicroStation under the WSDOT pull down menu.

Vicinity maps are to be drawn at a scale appropriate to the size of the project and the detail required to show the appropriate information, as discussed in Section 460.03.

Sheets requiring a larger scale to display a great deal of information in a small area should be drawn to an appropriate scale to allow all information to be easily read and understood.

Strip maps are to be drawn at a scale appropriate to display the information clearly.

There may be occasions when the scale of a plan sheet needs to be increased to as much as 1" = 40' for 11"x17" plan sheet. When this is done, the designer needs to examine the sheet to be sure that required information is easily read. It may be necessary to resize some text or symbols to make them legible.

The designer shall avoid the practice of cross-hachuring, or polka-dotting, or shading of large areas to represent areas to be paved, planed or anything else. The roadway sections will adequately show the areas to be planed and paved. The use of large areas of cross-hachuring only hides or distract from the rest of the information being displayed on the sheet.

Use cross-hachuring for small, isolated areas of work, such as pavement repair areas, or butt joint planing locations, that may get lost if not displayed in this manner. Gray area shading is reserved exclusively for use in an addendum to highlight changes to a plan sheet.
See Appendix 5; Addendum Preparation

Plan sheets may be plotted on paper from CADD or printed on paper from microcomputer files. Plan sheets may also be hand drafted in black ink.

Sheets utilizing a combination of CADD generated base maps and inked construction features will be considered hand-drafted sheets. No stick-ons are to be used on plan sheets.

All screened (half toned) portions of plan sheets shall be dark enough to adequately reproduce.

Line weight, lettering height, and symbols for contract plans shall conform to the standards contained in Division 5. It is important to conform to these standards for consistency and for reproduction reasons.

Under most circumstances, lettering and dimensioning shall be placed so they may be read from either the bottom of the sheet or the right side of the sheet. Text shall not be placed across roadway centerlines or right of way lines. Text is to be clear of all lines, and should normally be placed outside of the drawing itself. Leader lines shall not cross one another.

The two exceptions to the bottom and right reading text are:

1. All section corner and Township line numbers shall have their tops to the north, and Range line numbers shall have their tops to the west, regardless of the orientation of north to the sheet.

2. All information identifying a center line, such as line designation,

stationing, tick marks, and bearings, shall be placed on top of the line and read left to right, with both the top of the line and left to right being based on the direction of the stationing.

When lines are coincidental, the following order of precedence for placing them on the sheet shall be used:

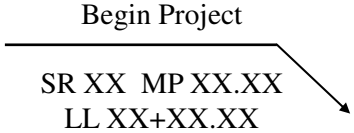
1. Construction Center Line
2. Right of Way Center Line
3. Range/Township Line
4. Section Line
5. Corporate Limit Line
6. County Line

When Corporate Limit lines coincide with other lines, the Corporate Limits will be labeled in an effort to clarify that the line is also the corporate limits.

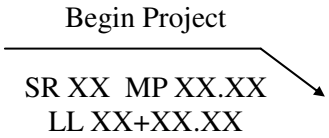
Each plan view sheet shall have a north arrow and a scale bar. The north arrow will normally be oriented towards either the top or right side of the sheet.

Plan view sheets and profile sheets that physically show the Begin and End of Project will identify these points as follows:

State funded projects:



Federal funded projects:



If the Begin and End Federal Aid are different than the Begin and End of Project, this information will be displayed similarly to the above, on a separate leader line drawn to the appropriate location. Use Begin and End Construction when work is being done on cross roads adjacent to the mainline work or at ramp terminuses.

Each series of plan view sheets, e.g. site preparation, drainage, paving, etc., shall have a legend of features applicable to that series, and the legend will appear on each plan sheet of that series.

The legend is to contain all items that are shown on any of the individual plan sheets in that series. [EXAMPLE] - If your drainage plan series consists of 15 plan sheets, and throughout these 15 plan sheets there are 12 items to be identified in the legend, all 15 of the drainage plan sheets in this series will have a legend that will have all twelve items listed and identified.

If a sheet in the series is too crowded to include a legend, a note shall be added to the sheet to tell the reader on which sheet the legend may be found. The preferred method is to refer the reader to the legend on the preceding sheet.

WSDOT contract plans show the slope of a line in several forms, i.e. ratio, percentage and decimal. When a slope is shown in ratio form, in WSDOT plans, it is shown as run over rise, which is opposite of mathematical standards in which a slope is always given as rise over run in ratio and fraction form. In WSDOT plans, a 4:1 slope means that the slope has a four-foot horizontal run and a one-foot vertical rise. Some WSDOT manuals further clarify the meaning of a 4:1 slope by adding a post test such as 4H:1V, to further clarify that there is 4 units horizontal (run) and one unit vertical (rise). However, WSDOT contract plans will not carry such a post text.

Plan sheets prepared by the Headquarters Architecture Office and their consultants, under the supervision of the Principal Architect, shall be exempt from the requirements of the drafting standards described in this chapter. Drafting for the construction, alteration or repair of WSDOT building projects shall conform to the drafting standards established by the Headquarters

Architecture Office. This includes the architectural plans, civil plans, and other related plans.

450 Plan Sheet Sizes and Layout Format

450.01 General

The Ad set of plan sheets shall be on 11-inch by 17-inch paper.

If the contract plans have more than 225 sheets or contract provisions have more than 225 pages, they will need to be separated into volumes, with no volume having more than 225 sheets or pages. The break for volumes is to be made at a logical point in the package, which may not be at 225 sheets or pages. If a project has 275 plan sheets, and the last 80 are bridge sheets, the logical break would be between the civil sheets and the bridge sheets. If multiple volumes are required for the contract provisions, the logical break would be at the end of a main section. For example, break between HOT MIX ASPHALT PAVEMENT and the following main section, CULVERTS. Do not place the break in the middle of a section.

WSDOT plans and specifications shall be stamped with a seal, signature, expiration date of license, and date signed as required by WSDOT Executive Order E 1012.00.

The following plan sheets prepared by WSDOT are not required to be stamped; index, vicinity map, summary of quantities, quantity tabulations, bar lists, TESC sheets and traffic control plans.

For plans prepared by consultant/developers, the Licensed Engineer's seal, signature, expiration date of license, date signed and logo shall be placed on all plan sheets adjacent to the WSDOT logo, except for the index to the plans, the vicinity map, the summary of quantities, quantity tabulations, and bar-lists are not required to be stamped. This space should be reserved during initial plan sheet layout.

Construction notes shall be numbered consecutively within each plan sheet series of the project. However, only the construction notes that are applicable to a particular sheet series shall be shown on that plan sheet. Once you have created a construction note 1, it will always be the same. Continue sequencing of construction notes consecutively as you add them. **DO NOT** re-sequence from one plan sheet to the next.

460 Plan Sequence

460.01 General

The following outline is the suggested sequence to follow when assembling plans for a construction project:

1. Index.
2. Vicinity map.
3. Summary of quantities.
4. Borrow, pit, quarry, stockpile, waste sites, and reclamation plans.
5. Roadway sections (main roadway, ramps, frontage roads, detours, and others).
6. Grading sections (if applicable).
7. Stage construction plans (if applicable).
8. Alignment / Right of Way.
9. Quantity tabulation sheets (Q-tabs). These sheets are to be placed immediately prior to the plan sheets showing the work being tabulated, such as site preparation items, Temporary Erosion and Sediment Control (TESC) items, guardrail items, traffic items, etc.
10. Site Preparation (existing topography, and removal and demolition work may be shown on alignment plans; however,

if extensive details are required, should be separate sheets).

11. Existing Utilities (this is an extension of the site preparation plan and is only required if the existing utilities are so extensive that they can not be clearly shown on the site preparation plan).

12. Roadway profiles (normally only required when the grade is being revised).

13. TESC plans (may not be required if work is minor and can be combined with drainage plans or other plan sheets). Refer to Division 7; subsection 750.27 for information on when a TESC plan is required.

14. TESC details.

15. Drainage structure notes (will precede plan series showing drainage features).

16. Drainage plans (may not be required if work is minor and can be combined with another series of plans).

17. Drainage profiles (will follow plan series showing drainage features).

18. Drainage details.

19. Utility structure note sheets (only required if there is work to be done by the contractor on existing utilities).

20. Utility plans (only required if there is work to be done by the contractor on existing utilities).

21. Utility details (only required if there is work to be done by the contractor on existing utilities).

22. Irrigation structure note sheets.

23. Irrigation plans.

24. Irrigation details.

25. Landscape, wetland, rest areas, and viewpoints.

26. Interchange contours.

27. Paving plans are required for overlay projects when paving breaks, paving dimensions, intersection paving, taper lengths and dimensions of taper widths, etc., can't be shown adequately on the roadway sections. In this case, the roadway sections, paving plans and paving detail sheets are to be prepared in conjunction with each other to show all the paving work.

28. Paving details.

29. Minor structures (retaining walls, etc.).

30. Illumination plans (may be shown on paving plans if illumination is minor and paving plan will not be too crowded).

31. Illumination details (will follow plan series showing illumination layout).

32. Traffic signal plans.

33. Traffic signal details.

34. Intelligent Transportation System (ITS) plans.

35. ITS details.

36. Signing specification sheets (will precede the plan series showing the signing).

37. Signing plans (may be shown on paving plans if signing is minor and paving plans will not be too crowded).

38. Signing details (will follow plan series showing signing).

39. Bridges and other structures.

40. Building plans and details.

41. Traffic control plans.

42. Detour routes and detour signing (if the detour is simple and straight forward, this information may be shown on the vicinity map, providing the additional information does not detract from the vicinity map).

The preceding is a list of possible plan sheets, and is not intended to represent a project. The designer is to determine the actual plan sheets required to best depict the project. Each project will require the designer to verify the order of plan sheets to determine what is or isn't required. A basic P1 paver will normally not require as many sheets as a project that has safety, mobility and paving work. Even with logical combinations of plan sheet series, the following basic order of sheets shall be maintained:

1. **item information** (quantity tabulation/ structure notes /sign specifications).

2. **plan series** (the series showing the items of work described on the quantity tabulation/ structure notes /sign specifications sheets).

3. **details** (for work associated with items shown on the plan sheets).

460.02 Index

See Example 4-1, 4-2.

An index is required for all projects with 30 plan sheets or more. A project with more than one volume of plan sheets shall have a complete project index, providing information on all volumes, in each volume.

List the plan sheet titles exactly as they appear on the plan sheets. Avoid sheet titles like "Miscellaneous Details". If a sheet contains guardrail and drainage details, use "Guardrail and Drainage Details" as the sheet title and on the index. Remember, not everyone that will be using the plans will be as familiar with them as the designer.

On small projects, and as scale permits, the index can be placed on the vicinity map plan sheet. However, DO NOT reduce your vicinity map size to allow you to combine the index and vicinity map as one plan sheet.

Regardless of the size of the project, it is recommended that plan reference numbers be used on all projects in lieu of plan sheet numbers during the design phase.

Plan sheet numbers are not critical during the design phase of the project. Until the design team leader or Region plans reviewer has all of the plan sheets for all separate series (paving, drainage, signing, etc.) to be included in the project, the total number of plan sheets to be included in the contract is unknown.

There are several advantages of using plan reference numbers to identify plan sheets for individual series during the design phase.

1. The designer doesn't have to know the total number of plan sheets included in the contract.

2. Once plan reference numbers have been assigned to individual plan sheets included in a series, these numbers will never have to be changed. This makes referencing details on other plan sheets easy to do and should eliminate the habit of forgetting to do this. Once the statement 'FOR DETAIL SEE SHEET D12' is placed on the plan sheet, this reference will always be correct unless plan sheet D12 is deleted from the contract.

3. Plan sheets can be inserted or deleted within the series without re-sequencing or renumbering the remaining plan sheets in that series.

460.03 Vicinity Map

See Examples 4-2, 4-3, 4-4, 4-5 and 4-6.
Every project will have a vicinity map plan sheet that shows, and has labeled, ***all*** construction centerlines, detours, and haul routes.

Projects may be broken into sections (see Example 4-3 and 4-4) when it is required or necessary to split the project into different areas.

This is the logical way of showing the work, to be performed, listing quantities, etc., when all the work involved is not conveniently located in one continuous area with no exceptions or gaps.

If the entire project is on one SR (State Route), but has breaks in the areas where work is to be performed between the Beginning of Project and the End of Project, these breaks should be labeled as "exceptions" or "exception areas". If there are numerous exceptions or exception areas, an alternate method of showing these exceptions is to label as Sections the areas where work is to be performed.

If the project has multiple SRs, where the work is definitely spread out, it is highly recommended that the work be broken into **Sections**.

AN IMPORTANT REMINDER

If the project is broken into sections, make sure all references to a section are exactly the same throughout all plan sheet series (Summary of Quantities, Roadway Sections, Quantity Tabulation sheets, Structure Note sheets, Profiles, etc.) in the plan set for that Section. All exception work areas and gaps must be shown identically in all locations and references throughout the contract plans and specifications.

Project limits are to be referenced to State Route Mileposts (SRMP) based on the State Highway Log (TRIPS System).

Stationing shall be stated at the Begin and End of Project on mainline and the Begin and End of Construction for secondary crossroads.

The Begin and End of Project are defined as follows:

> The begin and end of any permanent work on the mainline highway. If the project includes multiples SRs, there is still only one Begin and End Project. Begin Project is assigned to the beginning of permanent work at the most westerly or southerly portion of the project, and the End Project to the most easterly or northerly portion, determined by the general direction of the project activities. Thus projects with multiple SRs may have a Begin Project SR designation different from the End Project SR designation.

The Begin and End of Construction are defined as follows:

> The limits of permanent work, such as signing, guardrail, striping, drainage, landscaping, etc., that is performed on city, county or State roadways, when not described as mainline, as a part of the contract.

The Begin and End of federal funding shall be shown and referenced by federal aid number, milepost, and stationing. The federal funding limits will most often be the same as the project limits, but will cover all work.

All equations and exceptions shall be shown on the vicinity map. If the scale of the Vicinity Map is such that equations can be shown with headers and leader lines to the approximate point where the equation is located (by stationing), this is the preferred method to identify the equation. If there is insufficient room on the vicinity map itself (because of scale) to clearly identify the equation and exception areas, they may be shown in tabular form (data box) on the vicinity map plan sheet.

The distance in miles from the beginning of project (BEGIN PROJECT) to the nearest city or town and in the opposite direction from the other end of the project (END OF PROJECT) to

the nearest city or town shall be shown in miles on the vicinity map. Do not use "local" descriptions, such as "10 miles to EZ Corners". If the nearest city or town is shown on the WSDOT highway map, it should be recognizable enough to be used for this purpose. The city or town shall be one that is shown on the WSDOT highway map.

The vicinity map is the only place in the plans where the overall layout of the main line, ramps, frontage roads, and street locations are shown. County roads and city streets shall be shown and labeled if they are important to the project. Do not show county roads and city streets just to "fill up" the sheet. As with all plan series, delete anything that does not add value to the plan sheet or provide detail or information that your reader does not need.

The scale of the vicinity map shall be large enough to easily identify all construction lines and appropriate local and private streets or roadways. Do not reduce the scale in an effort to "squeeze" it all onto one sheet. A scale bar is to be provided on the vicinity map. In addition to including the scale bar the scale of the plan sheet, detail, etc., will also be shown in text underneath the scale bar.

Material sites, waste sites, stockpile sites, and haul routes will be shown. Do not reduce the scale of the vicinity map so these sites can be shown to scale. If they are too far removed from the project to be shown at the scale appropriate for the vicinity map, they can be shown in a separate box in a corner of the vicinity map sheet at a smaller scale. The haul route from the site to the highway shall be shown, and the distance in miles from the site to the nearest point on the project will be shown or noted.

Features such as railroads, waterways, and streams, as well as over-crossing and under-passing roadways shall be shown and named. Railroads running parallel to the project and adjacent to the right of way, are also to be shown. If the railroad crosses through the project, there is to be a clear indication of whether the intersection is at grade or not.

Wetland and wetland mitigation sites are to be shown on the vicinity map. The designer may have to draw the wetland sites out of scale in order to make them visible.

Bridges within the project (construction) limits shall be identified by bridge number and as being either "INCLUDED IN PROJECT" or "NOT INCLUDED IN PROJECT". A bridge is "included" in the project if something is being physically done to the structure, such as traffic barrier modifications, deck overlay, widening, earthquake proofing, or expansion joint work. Work that is simply attaching things to the bridge, such as guardrail or conduits, or work that does not affect the bridge, such as striping, would not cause a bridge to be "included in project".

Cadastral information (Township, Range, section information, etc.) is to be shown on the Vicinity Map and any plan sheets that show dimensioned right of way and/or limited access.

Township, Range and section information will be shown on the vicinity map as follows:

Township and Range lines will be shown and identified if they fall within the limits shown on the vicinity map.

If Township and Range lines do not fall within the limits shown on the vicinity map, Township and Range information will be shown at the top center of the vicinity map plan sheet.

Section lines will be shown with associated section corners, with section numbers. On small projects, or larger scale vicinity maps, this may require the use of break lines to bring the corners within the limits shown. If the corners are found, the ties to center line are to be shown. If there are no section corners within the limits shown, a quarter or sixteenth section line can be shown and the cadastral information (Township, Range, section information,

etc.) given to indicate where in the world we are.

460.04 Summary of Quantities

- See Example 4-7.

The summary of quantities sheet provides a complete tabulation of all bid items and pay quantities that have been determined by the designer/design team to be required for the project. Bid items and quantities are entered into the project estimate via EBASE (Estimate Bid Analysis System). The summary of quantities plan sheet is generated from the estimate database by requesting a summary of quantities report.

The summary of quantities shall be divided into groups, and columns within the groups.

A separate group is required for the following:

1. Whenever there is a change in program item number (PIN).

2. Whenever there is a change in program or subprogram (I2, P1, P2, etc.).

3. Whenever there is a change in funding (any change in funding participants, their individual participation rates, or their source of funding). Funding participants may be the FHWA, a state agency, county, city, other public agencies, private organizations, and participation agreements for work to be done by the contractor.

4. Whenever there is a change in control section.

5. A separate state funded group (one per project) is required for third party damages. The bid item "Reimbursement For Third Party Damage", is to be included in this group.

Each group is required to have at least one column associated with it. Additional columns within a group are required for the following:

1. Each bridge and structural retaining wall (those covered by Standard Specifcation Section 6-11 through 6-17) wall shall have its own column in order to identify materials quantities required to construct this item.

2. Each state furnished pit site (mandatory or not) shall have its own column.

There are exceptions that will be allowed for item number 1 above. For projects with a single wall or a single bridge, or both, the wall and bridge quantities may be entered into a single column or combined with another column. For projects with multiple walls, if the materials quantities required for each wall are clearly tabulated in the plans, these walls quantities may be entered into a single column or combined with another column in the Summary of Quantities.

In addition, when paving across multiple bridges, the paving quantities need not be separated out for each bridge and may be included in mainline paving quantities in the Summary of Quantities.

The intent of item number 1, above is to be able to identify the quantities of work at each wall or bridge during construction activities.

The designer is advised to use additional columns within groups to show quantity breakouts for individual construction lines. For example, by using separate columns for the main line, a frontage road, and each ramp, it is much easier to track and make quantity revisions during design, and much easier to track quantities for over- or under-runs during construction, than it is if all of the quantities are combined in a single column.

The quantities for the following types of items will appear only in the summary of quantities:

1. Lump sum items (an LS will appear on the summary of quantities for these items -- the approximate quantity for lump sum items will appear in the special provisions).

2. Force account items.

3. Water.

4. Aeration items.

5. Structure items, such as bridges, and structural retaining walls, etc. (although separate quantity tabulations are desirable for structural retaining walls when there is more than one wall in a project).

6. Borrow materials.

7. Surfacing materials.

8. Paving materials.

9. Temporary erosion and sediment control items and Topsoil (unless the specific areas of Topsoil placement can better be defined by showing quantities on the profiles or a specific plan sheet).

10. Sign covering.

11. Sequential arrow sign.

12. Contractor piloted traffic control.

13. Traffic control labor.

14. Construction signs Class A.

15. Traffic control supervisor.

16. Traffic control vehicle.

17. Spill Prevention Plan.

18. ESC Lead.

Bid items shall be listed in the same order as they appear in the current Standard Item Table.

Bid items not listed in the Standard Item Table shall be intermixed, according to type of work, with the bid items that are listed. Bid item names for nonstandard bid items shall be singular in form. See Section 750.23 for additional information on standard items.

The Standard Item Table provides useful information to the designer in the last column to the right on this table (Item Use Message). Listed in this column is a statement that will tell the designer what, if anything needs to be done if this bid item is used in the project. Some of the statements that are listed in this column are as follows with a definition of the statement:

STANDARD ITEM
Indicates that this bid item is a standard item and is covered in the Standard Specifications. The designer may not need to do anything to revise or supplement the information provided in the Standard Specifications.

However, the designer must decide if information concerning this bid item as addressed in the Standard Specifications is sufficient or if more "project specific" information is required.

REQUIRES SPECIAL PROV.
Indicates that the designer needs to do one of the following:

1. Revise the appropriate section or sections in the Standard Specifications.

2. Supplement the appropriate section or sections in the Standard Specifications.

3. Write a "stand alone" project specific specification because the Standard Specifications do not

contain information or direction for this item of work.

STD. ITEM, GSP REQUIRED
Indicates this bid item is a standard item, is covered in the Standard Specifications and there is a GSP (General Special Provision) that needs to be included in the contract special provisions when this bid item is used. It is the designer's responsibility to ensure the GSP is applicable or "project specific" to the contract.

GSP ITEM
Indicates that a GSP exists and must be included in the contract special provisions. It is the designer's responsibility to ensure this GSP is applicable or "project specific" for the contract.

AMENDMENT ITEM
Indicates that an Amendment exists and must be included in the contract special provisions when this bid item is used.

REQ SPECIAL, HQ APPROVAL
Indicates that when this bid item is used, a project specific special provision must be written and Headquaters Construction Office approval must be given prior to including this special provision in the contract.

HEADQUARTERS USE ONLY
Indicates this bid item will be included in contracts only when directed by Headquarters Construction Office.

TECHNICAL SPECIFICATION
Indicates this bid item will require a technical special provision to be written. Architects generally write this type of special provision. These bid items are typically used only for architectural type work (building construction at ferry terminals and rest areas, etc.)

SUPERSTRUCTURE ITEM
Indicates this bid item is to be used in conjunction with Standard Bid Item 4300 ONLY. The 9000 series bid items are to be used only to provide lump sum breakout data for bid item 4300 "Superstructure - XXXXXX".

DO NOT use the 9000 series bid items as stand alone bid items in your contract estimate.

A quantity shall not be duplicated within the body of the plans. The item totals shown in the summary of quantities shall be the sum of the quantities shown for the item throughout the plans. Quantities are typically listed in the quantity tabulation, structure notes and profile plan sheets. When quantities for an item appear in places other than where your reader would expect to find them or when quantities for an item appear in two or more places throughout the plans, a cross-referencing statement, such as "FOR ADDITIONAL QUANTITIES - SEE SHEETS Qnn and Wnn", shall be included.

Quantities for such work items as pigmented sealer, whose cost is included in the cost of the associated concrete, are shown in the plans for the sole purpose of aiding the contractor in the bidding process, and shall be accompanied by the note, "Informational Only."

Care must be taken when calculating quantities for surfacing and paving materials to ensure reasonable accuracy. The Design Manual contains units and conversion factors for estimating surfacing and paving quantities.

Quantities listed in the summary of quantities are intended to be representative of the work to be performed. Rounding will take place each time a quantity is placed on a quantity tabulation sheet, on a profile sheet, or other location in the plans. The total of the rounded quantities will be carried forward to the summary of quantities.

The following general rules shall apply to the rounding of quantities:

1. Items having an estimated unit price of $9.99 or less will be shown to the

highest multiple of 10; for example, 3,640 (not 3,637) units of haul at $0.50, and 560 (not 554) tons of ballast at $1.25.

2. Items with an estimated unit price of $10.00 to $99.99 will be shown to the nearest full digit; for example, 61 (not 60.5) cubic yards of concrete at $43.00.

3. Items with an estimated unit price of $100.00 or more will be shown to one decimal place; for example, 18.3 (not 18.25) acres of clearing at $1500.00.

4. Exceptions to numbers 1, 2, and 3 above:

   a. Earthwork items, roadway excavation, embankment compaction, and borrow excavations are to be rounded to the nearest multiple of 10 units, regardless of price. The rounding for roadway excavation and embankment compaction will be made for each entry on the profile sheets. The borrow quantities will be rounded to the nearest 10 units and placed on the summary of quantities. On a new construction project, with extremely large earthwork quantities, the quantities could even be rounded to the nearest 50 units at each entry on the profile sheets.

   b. HMA and crushed surfacing items are to be rounded to the nearest 10 units.

   c. Pipe items will be rounded to the nearest foot for each pipe run entered on the structure note sheets, regardless of price.

A good source to use for determining the estimated unit bid prices for quantity rounding purposes is the WSDOT **UNIT BID ANALYSIS AND STANDARD ITEM TABLE**. If this is not available through your Region Intranet Home Page, it can be accessed via the WSDOT Internet pages through the Project Development Home Page. Use the **UNIT BID ANALYSIS STANDARD ITEM TABLE** button to start this application.

460.05 Contract Reclamation Plans

- See Example 4-8.

A Contract Reclamation Plan will clearly set forth all reclamation work to be accomplished in the contract.

A Contract Reclamation Plan is required for every WSDOT contract that contains a WSDOT furnished material source. The Contract Reclamation Plan will be based on the Ultimate Reclamation Plan. A reproducible (reverse reading mylar) of the approved Ultimate Reclamation Plan can be obtained from the region Materials Laboratory. This plan will be modified to create a Contract Reclamation Plan. The Contract Reclamation Plan will be included in the contract plans.

By RCW 78.44, the approved ultimate REC plan has to be followed or WSDOT is subject to fines for each incident. If the contract work requires deviation from the ultimate REC plan, a modification to the ultimate REC plan has to be submitted for Department of Natural Resources (DNR) approval prior to beginning work at the site.

In some cases, Contract Reclamation Plans need to be developed during Contract Plan preparation for sites that do not have Ultimate Reclamation Plans. Materials sources located on Federal Land or sites smaller than three acres in area usually do not have Ultimate Reclamation Plans.

The Contract Reclamation Plan shall show the following:

1. The existing contour lines shown on the Ultimate Reclamation Plan when it was approved will be updated to show the topography as it exists immediately prior to the contract. Only the contours in the portion of the site affected by your project need be shown, not the contours for the entire site.

2. The contractor's designated work area will be noted.

3. The available raw material will be indicated, or, when appropriate, a note may be added on the plan stating that sufficient raw material is available for the project.

4. A block detailing materials to be produced and reclamation items needed under this contract.

5. The interim and reclaimed slopes shall be no steeper than the slopes on the Ultimate Reclamation Plan.

6. Specific directions for excavation will be added as a note, e.g., "Excavation shall progress to full depth from the existing face of excavation toward the southeast."

7. Only notes on the Ultimate Reclamation Plan that are applicable to work being performed under the contract are to be included on the Contract Reclamation Plan.

8. Other notes and information necessary to the specific contract will be added. It is the intent that the Contract Reclamation Plan stand alone for the work (reclamation) to be accomplished under the contract.

It is the designer's responsibility to verify with the region Materials Laboratory that the quantity of available material is accurate, and that it is possible to produce all the materials listed within WSDOT specifications. If the contractor will be required to perform some special or extra work to manufacture material that meets the specifications, the special or extra work requirements are to be included in the special provisions.

Quantities for stripping, clearing and grubbing, and all other items of work to be performed within a site, shall be tabulated on the plan. If it is a non-mandatory site, the items of work shall be site specific ("Clearing and Grubbing - Site QS-A-495"). If the site is mandatory, the work will fall under the general contract work item ("Clearing and Grubbing"), but will be shown in a separate column.

Identification numbers for stockpile and waste sites are assigned by the regional Materials Laboratory. Although a Contract Reclamation Plan is not required for stockpile or waste sites, the Plans shall indicate any restrictions on the use of such sites.

Access to the sites shall be shown. If an access road is to be built, rebuilt, or widened, indicate the width of right of way, and clearly identify all work to be performed by the contractor on the access roads as a part of the contract. How the contractor will be paid for the access road work will be outlined in the contract provisions.

Agreements are required with the owners of all roads that make up the haul route. These agreements will indicate WSDOT's and the contractor's responsibilities for returning the roadway to the "before hauling" condition.

460.06 Roadway Sections

- See Examples 4-9, 4-10, 4-11, 4-12, 4-13, and 4-14.

Roadway sections are to provide complete geometric information on the roadway cross section from the sub grade up and general information left and right of centerline. The information on the roadway sections will tie directly to the paving plans and the profiles, if these series of plans are included in the project.

On federal aid projects, future paving and surfacing depths, required to bring the roadway to the ultimate design cross section, shall be shown in order to qualify for future participation by the FHWA.

Roadway sections are required for every combination of surfacing and paving depths used on the mainline, ramps, detours, frontage roads, road approaches, city streets, etc.

Roadway sections are to represent conditions from the sub grade up for the entire length of the construction line(s) (mainline, ramps, detours, frontage roads, road approaches, city streets, etc.) included in the project. Start at the beginning station on an alignment and identify all stationing to the end of line without gaps or overlaps.

When drawing roadway sections, it is recommended that proportional scaling be used to indicate lane widths and depths of materials to be placed. A 12 foot lane should be drawn so that it appears slightly larger than a 10 foot shoulder. A 0.15 foot lift of HMA should be drawn so that it appears approximately one quarter of the thickness of a 0.60 foot lift of gravel base course.

Roadway sections should be drawn to reflect how the work is expected to be performed in the field. If HMA is to be placed in multiple lifts, draw the roadway section to reflect this fact by showing the number of lifts with required depths of each lift. Show each lift with an edge line that would indicate where each lift would end left and right of center line. **DO NOT** simply draw each lift of HMA to extend out into the shoulder, unless this is exactly how the HMA is to be placed.

Variable dimensions (Example: Varies 2' to 10') may be used to represent differences in shoulder or lane widths, or transition areas, as long as there is a paving plan that clearly shows, by stationing, the actual widths desired. If the project is a pavement overlay project and no paving plan is going to be provided, the use of variable horizontal dimensions is discouraged, unless construction notes are used to describe, by stationing, where the variable paving widths or transitions begin and end.

A generic roadway section for bridges must be provided to avoid having gaps in stationing. If the bridge is being overlayed, additional detail will be required. When a project has a structure on main line or a secondary line, that is not included in the project, a paving exception should be noted on the roadway section sheet.

Bridge approach slabs, if required, shall be shown as a separate roadway section.

Station equations, and paving or project exceptions are to be shown in proximity to the roadway section to which they apply.

Each roadway section in the project shall show the following applicable items:

1. Horizontal dimensions of the roadways, as approved in the Design Decision Summary.

2. Project specific design details and features required, such as curbs, sidewalks, riprap, etc.

3. The depths of surfacing and paving.

4. Station to station limits for each line represented by the roadway section.

5. The position of the profile grade, the pivot point for super transition, and the construction center line.

6. The depth from profile grade to the roadway surface being constructed, if the project does not include ultimate design surfacing. This depth shall be labeled "Future".

7. The type, width, and thickness of the existing surface, if the characteristics of the existing surface will affect construction.

8. A general note indicating that all surfacing and paving depths are compacted depths and courses shall not exceed depths defined in the Standard Specifications.

9. The roadway ditch depth shall meet the design criteria as stated in the Design Manual. A slope table should be used when embankment and excavation heights vary enough to require different slope rates. Show side slopes for embankment sections, in-slopes and back slopes for excavation areas.

10. A section showing shoulder widening for guardrail. If shoulder widening for guardrail is isolated to one or two roadway sections, it can be shown as part of the particular section. If shoulder widening for guardrail applies to several roadway sections, a separate shoulder widening section can be drawn and referenced from the applicable roadway sections.

11. A section showing the shoulder design on the outside of a curve (superelevation section) if the project involves constructing subgrade on the outside of curves. This is a standard CADD detail and need only be shown once.

12. A surfacing legend is to be shown on each sheet indicating the type of surfacing material, with the exact item name as found on the Summary of Quantities. For HMA it is necessary to indicate the class of material used but not the performance grade (PG) when only one grade is used for the entire project. If however there are two or more performance grades used on the project then they must all be detailed on the roadway sections. Each type of material shall be assigned an identifying number enclosed by a hexagon symbol.

13. Construction notes shall be numbered consecutively for the project, but only the construction notes that are applicable to a particular sheet will be shown on the sheet. Once you have created a construction note 1 it will always be the same. Continue sequencing of construction notes consecutively as you add them. **DO NOT** resequence from one plan sheet to the next.

    For example:

    Sheet R1 may have construction notes 1, 2, 3, and 4.
    Sheet R2 may have construction notes 1, 3, and 5. (Notes 1 and 3 on sheet R2 would be identical to notes 1 and 3 on sheet R1 and note 5 on R2 is a new note, consecutively numbered).

14. If the total paving depth for a class of HMA exceeds the nominal compacted depth specified in the Standard Specifications, one of the following methods of indicating the paving requirements will be used:

    a. Multiple lifts shall be drawn on the roadway section, indicating the desired minimum compacted depth of each lift.

    b. Provide a construction note for the roadway section specifying the number of lifts required and the maximum allowable compacted depth for any lift.

    If you don't show paving depths in your roadway sections as specified in 14a or 14b above and the paving depths for your project exceed normal depths (as indicated in the Standard

Specifications), you should take another look at Section 5-04.3(9). In part it reads:

> **5-04.3(9) Spreading and Finishing**
>
> The mixture shall be laid upon an approved surface, spread, and struck off to the grade and elevation established. HMA pavers complying with Section 5-04.3(3) shall be used to distribute the mixture. **Unless otherwise directed by the Engineer, the nominal compacted depth of any layer of any course shall not exceed the following :**

The bold sentence in the preceding paragraph is where our plans get us in trouble if they are not in accordance with 14a or 14b above.

When roadway sections show paving depths that exceed the allowable depths listed in the Standard Specifications. The depths shown in the Plans will govern in accordance with the order of precedence (Section 1-04.2).

460.07 Grading Sections

- See Example 4-15.

These plan sheets will show such items as types of embankment, use of waste in slope flattening, drainage layers, composite sections, relief ditch details, slope tables, unsuitable stripping depth tables, controlled blasting slopes, wetlands sections, horizontal drain details, surcharge details, large unsuitable foundation excavation and backfill areas, and soil stabilization details. Most projects will not require grading sections.

460.08 Quantity Tabulation Sheets

- See Example 4-17 Appendix 1.

Quantity tabulation sheets are used to tabulate the locations, quantities, and notes pertaining to specific bid items.

The following types of items will normally appear on quantity tabulation sheets:

1. Removal items (except items paid by lump sum).
2. Asphalt concrete curb and asphalt concrete gutter.
3. Timber and lumber (except bridge items).
4. Cement concrete approach.
5. Cement concrete curbs, and curb and gutter.
6. Guardrail items, including anchors, terminals, and transition items.
7. Concrete barrier items.
8. Impact attenuators.
9. Guide posts.
10. Raised pavement markers, paint lines, and pavement marking items.
11. Conduit pipe (except bridge, illumination and traffic signal system items).
12. Wildlife reflectors.
13. Steel reinforcing bars and wire mesh (except bridge structural retaining walls and drainage items).
14. Monument cases and covers.
15. Cement concrete sidewalk.
16. Asphalt concrete sidewalk.
17. Concrete slope protection.
18. Fencing items, including gates, and end, corner and pull posts.

19. Adjustment items.

20. Delineation lights.

Quantity tabulation sheets are to be prepared on 11-inch by 17-inch paper sheets printed from excel files. The excel spreadsheet program is available through the Regional Plans Offices or the Headquarters Project Development Branch. For additional information and instructions for this excel spreadsheet, (see Appendix A1).

Standard sheets have been prepared with the heading "Quantity Tabulation". A descriptive addition (see types of items above) may be added after the plan sheet heading "QUANTITY TABULATION- XXXXXXX XXXXXX" to indicate what type of work is included on this plan sheet.

Quantity tabulation sheets are to be placed immediately preceding the plan sheets that contain the tabulated items. This will intersperse them throughout the plans.

For projects involving only a few items, the quantities may be placed in data boxes on appropriate plan sheets or on profile sheets, eliminating the need for quantity tabulation sheets. Data boxes should be layed out in the same manner as the Q-tab sheets.

Blank columns shall be provided between listed bid items and blank rows shall be provided in station listing (about every fifth entry and a space or two between each reference sheet listed). This procedure allows for the addition of bid items and stationing with ease, even during the addendum phase.

The bid items shall be placed from left to right in the same order in which they appear in the Estimate.

Bid items shall be identified on the Quantity Tabulation sheets exactly as they appear in the WSDOT spec book (spelling, punctuation, spacing, etc.) and in the same order as they appear on the Summary of Quantities.

If there are more bid items to be tabulated than will fit across the top of the sheet, with the appropriate blank spaces, additional tabulation sheets will be required. The station listing will be identical for the continued sheets. Likewise, if there are more station listings than will fit on a single sheet, with the required blank spaces, additional tabulation sheets will be required. The bid items across the top will be identical for the continued sheets.

Each time an item is used in a different location, it will have a separate quantity entry. Related items, however, may be included in a single entry if the station limits are the same. For example, a single entry could include the type of guardrail, required anchors, and transition types.

Each quantity entered on the quantity tabulation sheet is to be rounded appropriately at the time of entry. Do not add up the unrounded quantities and round the total to carry forward to the Estimate/Summary of Quantities. See the information on rounding in Section 460.04.

The bid item totals on the Quantity Tabulation sheets must be consistent with the bid item totals entered in the Estimate.

The ***Code*** column shall contain the quantity tabulation code number, which is made up of the Plan Reference No. and the number identifying the individual construction feature on the sheet. (P1-1, P1-2, … P1-6, P2-1, P2-2, … P2-26) The numbers shall be listed in ascending order of plan sheets.

Bid items, identified by station(s) and quantity or quantities, on individual quantity tabulation sheets are tied directly to the plan sheet series they are related to by the number immediately following the Plan Reference No. as mentioned above. The related series sheet shall have its own consecutive series of numbers identifying construction features (octagonal enclosed numbers beginning with number 1) beginning in the top left corner of the sheet and progressing across and down the sheet. A light, arrow-less line shall be drawn from the octagon to the construction feature. When a construction

feature is continued on more than one sheet, the octagon, on the continued sheet, shall be divided with a horizontal line, and the plan sheet reference number on which the construction feature first appears shall be inserted in the upper half and the first sheet individual identifying number shall be inserted in the lower half. A larger scale octagon may be used if this is done. The octagonal symbol shall not be used for any other purposes.

For items such as pavement markings, that are continuous for the entire project, list the station limits and leave the code column blank.

The General Notes will include information required to complete the data for a particular construction feature, such as:

1. Guide post type and color.

2. Wildlife reflector type.

3. Guardrail placement case, terminal connection, alternate anchor type, connection type when connecting transition to stiffer barrier, such as bridge rail.

4. Acceptable impact attenuators for each location.

5. When making a reference in the General Notes to a special provision in the contract, do NOT use the statement "SEE SPECIAL PROVISIONS". Identify the special provision exactly by name.

6. When making a reference in the General Notes to a detail in the contract plans, do NOT use the statement "FOR DETAIL SEE PLANS". Identify the exact plan sheet (using the Plan Reference No.) where the detail is located.

7. When making a reference to the Standard Plans, give the full Standard Plan number.

8. Type of curbing to be used.

If the quantities for an item appear on other plan sheets, in addition to the quantity tabulation sheets, cross-references shall be made to the sheets where the additional quantities can be found.

460.09 Alignment / Right of Way Plan

- See Examples 4-16 and 4-18.

The alignment and right of way information will appear on the same series of plan sheets for most projects.

Right of way is required to be shown for projects having work outside of the existing toe of fills or existing bottom of ditches. If the widening work is sporadic throughout the project, it is permissible to show the R/W only in the areas of the widening. If the areas are closely spaced, it is best to provide the R/W through the entire area, or the whole project, as opposed to showing a section of R/W for 100 feet, then a 100 foot gap, and then another 100 foot section.

If R/W information is not required, as for a paving project, for example, the alignment information could be shown on another plan series, such as the site preparation plan series or the paving plan series, as long as the additional information does not cause overcrowding of the plan sheet.

Site preparation information may appear with the alignment and right of way plan series only if there is minimal existing topography and minimal site preparation work to be shown. If there is considerable topography or a great deal of site preparation work to be shown, the information is to be placed on a separate plan series.

The following information will normally appear on the alignment / right of way plan series:

1. Construction center lines for all roadways being constructed.

2. All stationing, bearings, and curve data associated with each construction center line (for new construction ramp stationing will ***always*** run in the same direction as the mainline stationing).

3. Right of way center line (not always required - see discussion below).

4. Right of way lines (***all*** R/W lines, without exception, will ***always*** be solid lines on the contract plans).

5. Ties of all right of way breaks to either the right of way or construction center lines (show both station and offset distance).

6. Construction permits with private citizens, and all easements, identified by type and use.

7. Ties of all construction permits and all easements to either the right of way or construction center line (show both station and offset distance).

8. Township and Range lines that cross center line, with appropriate descriptive information (bearing and distance to found corners), including center line stationing at intersection point.

9. Limited access hachures when appropriate (hachures need to be drawn to the correct stationing, but the stationing of the ends or breaks in limited access do not have to be identified on the construction plans).

10. Found section corners and monuments, with station and offset ties to construction center line.

11. Station and offset ties to railroads and railroad rights of way that intersect the project or are affected by the project.

12. Corporate limit and county lines with station identification where they cross the construction center line.

13. Names of rivers, streams, bays, and inlets, their direction of flow, meander lines, ordinary high tide or high-water lines of navigable waterways.

14. On all projects that include grading, the slope catch lines shall be shown. It may be desirable to show slope catch lines on the drainage plan, however, the right of way line must also be shown on the drainage plan if this is done.

15. The outline of sand drainage blankets, unsuitable foundation excavation, and toxic waste excavation areas.

16. Show all found property corners along WSDOT R/W lines with a note stating "Per RCW 59.09.13 any monument or corner disturbed by the Contractor's operation shall be replaced at no cost to the Contracting Agency".

When the right of way center line is coincidental with the construction center line, an equation shall be provided at the begin and end of project, to show the relationship between the official right of way stationing and the construction center line stationing. An equation will be provided to show relationship between the construction center line and the right of way center line at the location of right of way plan equations. All right of way offsets and associated stationing will then be referenced to the construction center line.

When the right of way center line is ***not*** coincidental with the construction center line, the same procedure described in the previous paragraph may be used. The offset distance between the right of way and construction

centerlines shall be shown at the begin and end of project. In addition to the equations at the begin and end of project, equations shall be shown at all points where the right of way and construction center lines cross and at the location of right of way plan equations.

The official right of way plans may be included in the contract plans under the following circumstances:

1. The official right of way stationing runs the opposite direction of the construction stationing.

2. The right of way alignment is substantially different than the construction alignment and is not easily tied. As an example: the right of way alignment has numerous curves that do not exist in the construction center line and the right of way would have to be described using metes and bounds as opposed to offsets from the construction center line.

If either of the two circumstances above exist, the designer needs to contact the Headquarters R/W office and request that they prepare the existing right of way plans to be included in the contract plans. The designer will have to provide the R/W office with the equation relating the begin and end of the project construction center line to the existing R/W stationing. If this option is used, the Headquarters R/W office needs to be notified early in the design process so that the work can be added to the Headquarters R/W office schedule, to ensure that the plans can be prepared within the PS&E schedule.

If the project requires profile sheets be included in the contract plans, the layout of the alignment plan sheet must take into account that the station limits on each profile plan sheet are to match exactly the station limits of each alignment plan sheet. Horizontal alignment and steep grades can each affect the matching of stationing limits between the alignment and profile sheets, so they must be examined together. The alignment and profile may be shown on the same plan sheet by using the plan/profile sheet.

Township and Range information is to be shown on the vicinity map. It does not have to be shown on the alignment plans unless one or both of the following cases occur:

1. The Township or Range lines cross the centerline, in which case the line will be shown with the station of the intersection identified.

2. Right of way boundary lines are shown WITH dimensions from the roadway alignment.

Section lines only have to be shown on the alignment plans if the section corners are found, requiring the ties to centerline be shown.

The following information will be shown for all horizontal alignments:

1. Line identification, using alpha designation, and stationing (M 5+50).

2. Station ticks shown on the top side of the alignment line (top as related to the direction of the stationing).

3. Tangent bearings.

4. Point of curvature (P.C.) and point of tangency (P.T.) for all horizontal curves.

5. Angle points (A.P.) in horizontal alignments.

6. Curve data box showing:

    a. station of the point of intersection (P.I.) of bearings for each curve.
    b. delta for each curve (deflection angle between intersecting bearings).
    c. radius of each curve.

d. tangent length for each (distance from P.C. and P.T. to the P.I.).
e. length of curve for each curve (distance from P.C. to P.T. along the horizontal curve).
f. full super rate for each horizontal curve.

Construction stationing shall increase from the beginning of the project to the end, and shall run from south to north on odd numbered highways, and west to east on even numbered highways.

All ramp stationing for new construction shall increase in the same direction as the mainline stationing. Ramp stationing should begin at station 10+00 to avoid negative stationing due to alignment changes.

Offset equations shall be shown on the construction plans as follows:

1. The secondary line (ramp, cross-road, or right of way center line) designation and station is listed first.

2. The mainline (construction center line) designation and station, perpendicular distance, and left or right is listed next. The direction (left or right) is referenced from mainline looking ahead on line.

Linear equations should not be an issue if the designer establishes construction stationing for the project, instead of using right of way stationing. If linear equations are present, the designer must make sure that they are gap equations and not overlap equations. Overlap equations cause confusion because of the duplication of stationing caused by the overlap. To convert an overlap equation to a gap equation, a 1 can be added in front of the Ahead station (5+00 would become 15+00), or by adding 1 to the first digit of the Ahead station (110+00 would become 210+00).

Examples:

Overlap equation 10+00 BK = 5+00 AHD
add 1 in front of the Ahead station would become

Gap equation 10+00 BK = 15+00 AHD

Overlap equation 150+00 BK = 110+00 AHD
add 1 to the first digit of the Ahead station would become

Gap equation 150+00 BK = 210+00 AHD

When showing the equation on the plans, the BACK station goes on the back-side of the equation line and the AHEAD station goes on the ahead-side of the equation line.

460.10 Site Preparation

- See Example 4-18.

The site preparation series of plans is where all existing topography within your project limits is to be shown, as well as all the removal and demolition work involved with your project.

If there is very little topography to be shown and very little removal and demolition work to be performed, this information can be shown on the Alignment/Right of Way plan series as long as it does not compromise the information required on the Alignment/Right of Way plans.

The construction center lines will be shown on the site preparation plans, but lanes, shoulders, and other features being constructed are not to be shown.

Removal and demolition of existing features, paid as separate items, are to be identified using Quantity Tabulation notes.

Items included in the lump sum price for "Removal of Structures and Obstructions", are to be identified with notes located directly on

the appropriate plan sheet. For example, removal of wire fence should be identified with a note such as “wire fence to be removed”. Items of work included in the lump sum price for “Removal of Structures and Obstructions“ that cover the entire project, removal of guide posts for example, do not have to be identified on the plan. Items of work being paid as "Removal of Structures and Obstruction" will not appear on quantity tabulation sheets.

If large, complete areas of pavement, sidewalk, or curbs and gutters are being removed, it is best not to use cross-hachuring to identify these areas. It will suffice to show the limits of the removal and identify the area with a Quantity Tabulation note, or note on the plan sheet “begin pavement removal/end pavement removal”. If there are a number of small isolated areas of pavement removal, cross-hachuring may be used to identify these areas. Large areas of cross-hachuring actually detract from the plans and often hide important information.

460.11 Profiles

- See Example 4-20.

Roadway profiles are required only when there is a change in the vertical alignment of the roadway under construction. If only a section of the vertical alignment is changed, a profile is required only for that section.

The station to station limits shown on each profile sheet match exactly the station to station limits shown on the corresponding alignment sheet.

The following information is required on profile sheets:

1. The limits of roadway sections will appear with arrows. (These are always to be the top most entry on the profile sheets.)

2. Superelevation diagrams (these should be shown on a separate sheet if they cause crowding of other required information).

3. The finished profile grade line will be shown as a heavy solid line.

4. The datum symbol with North American Vertical Datum (NAVD) 88 is to be shown on the first roadway profile sheet only.

5. Show benchmarks that exist in the area of the alignment profiled on the sheet (both temporary and permanent benchmarks). Be sure to include all pertinent information associated with the bench mark (e.g. location, offset, stationing, elevation of bench mark, etc.)

6. Beginning station and elevation (BVC) and ending station and elevation (EVC) of each vertical curve will be shown. Elevations and stations through each vertical curve will be shown on even stations at intervals of 50 ft. minimum to 200 ft. maximum.

7. The station and elevation of the point of intersection of the gradients (VPI) will be shown.

8. Gradients between vertical curves (shown as a percentage, carried out to a sufficient number of places so that the calculation from the elevation at one VPI on the given gradient will give the elevation at the next VPI).

9. Length of each vertical curve.

10. Elevation and station at each break (angle point; AP) in gradient with elevation shown to 0.01 foot.

11. The existing ground line will be shown as a dashed line.

12. Areas of work or quantities will be shown, with arrows, between the station to station limits of the work, or

at 10 station (1000') totals if the work extends beyond 10 station totals , or at other logical breaks, such as bridges or group breaks. If these logical breaks are slightly more or less than 1000 feet apart, it would be appropriate to have a 1300 foot total or a 700 foot total.

13. Quantities to be shown will be roadway excavation, controlled blasting, vertical sand drains, unsuitable foundation excavation, toxic waste excavation, embankment compaction, special backfill, clearing and grubbing, seeding, compost, topsoil and fertilizing and mulching.

14. The use of the term "embankment" by itself is permitted only when Method A compaction is specified. In this instance, it must be noted that embankment quantities are shown for informational purposes only.

15. Details showing side slopes for unsuitable foundation excavation and toxic waste excavation shall be shown on the profiles or detailed on separate sheets. The bottom of unsuitable foundation excavation and toxic waste excavation will be shown, but should be shown as a squiggly line to indicate that the actual bottom elevation of the excavation is unknown.

The designer needs to give some thought to the layout of the profile sheets prior to placing information, because the layout is to be the same on each profile sheet in the series. All quantity arrows are to be placed in the same position on each sheet to allow quantities to be located easily.

If there is only minor grading on the project, and profile sheets are not used, 10 station totals, or similar quantity breakdowns, will be shown on a quantity tabulation sheet.

460.12 Structure Notes

- See Example 4-21.

All of the information shown on the structure note sheet, and the drainage plans and profiles, will meet the requirements contained in the Hydraulics Manual and Standard Plans.

Structure note sheets are used to tabulate locations, bid items, quantities, and notes pertaining to the drainage items, utilities, water lines etc.

The structure note sheets are to be on 11-inch by 17-inch paper sheets printed from excel files, or plotted from CADD. The excel spreadsheet is available through the Regional Plans Offices or the Headquarters Project Development Branch. For additional information and instructions for this microcomputer spreadsheet, see Appendix A1.

Standard sheets have been prepared with the heading "Structure Notes." A descriptive addition, such as "Utilities," or "Irrigation," shall be added after the plan sheet heading "STRUCTURE NOTES - XXXXXXX XXXXXX" to indicate what type of work is included on this plan sheet. Structure Note sheets are to be placed immediately preceding the plan sheets that contains the features being tabulated.

For those projects involving only a few drainage bid items at a few locations, the information normally provided on structure note sheets may be provided on the appropriate plan sheets, in either a tabular form in data boxes, or placed in a convenient location on the sheet with a leader line used to connect the information with the corresponding drainage feature.

Blank columns shall be provided between listed bid items and blank rows shall be provided in station listing (about every fifth entry and a space or two between each reference sheet listed). This procedure allows for the addition of bid items and stationing with ease, even during the addendum phase.

The bid items shall be placed from left to right in the same order in which they appear in the Estimate.

Bid items will be identified on the Structure Notes plan sheets exactly as they appear in the WSDOT Standard Item Table (spelling, punctuation, spacing, etc.).

If there are more bid items to be tabulated than will fit across the top of the sheet, with the appropriate blank spaces, additional tabulation sheets will be required. The station listing will be identical for the continued sheets. Likewise, if there are more station listings than will fit on a single sheet, with the required blank spaces, additional tabulation sheets will be required. The bid items across the top will be identical for the continued sheets.

Each time an item is used in a different location, it will have a separate quantity entry. Related items, however, may be included in a single entry if the station limits are the same. For example, a single entry could include a catch basin, pipe, structure excavation and riprap.

Each quantity entered on the structure notes plan sheet is to be rounded appropriately at the first point of entry. Do not add up the unrounded quantities and then round the total to carry forward to the Estimate. See the information on rounding in Section 460.04.

The ***Code*** column shall contain the structure code number, which is made up of the Plan Reference No. and the number identifying the drainage features on the sheet. (D1-1, D1-2, … D1-6, D2-1, D2-2, … D2-26) The numbers shall be listed in ascending order of plan sheets.

Indicate the construction center line stationing on the structure note sheet for cross culverts, and indicate station and offset for each end of longitudinal pipe installations. If a sanitary or storm sewer line stationing is used, the sewer line stationing will be used on the structure notes and the plan sheets will indicate the appropriate ties to the construction center line.

The bid item for storm sewer pipe will be "Schedule ___Storm Sewer Pipe ___ In. Diam." A table indicating the acceptable pipe alternates is included in Section 7-04 of the Standard Specifications. There will be times when not all of the pipes shown as acceptable alternates in the table will be acceptable because of conditions on a specific project. When there are pipes not acceptable for a specific project, the designer will include a general note on the structure note sheet identifying the unacceptable pipe type. The Hydraulics Manual contains a complete discussion on storm sewer pipes and is to be used for guidance.

When WSDOT does sanitary sewer pipe work, it is usually to extend or replace a system affected by the highway work. The utility or local agency will normally specify the type of pipe, or specify the pipe extension or replacement to be in kind. The system owner's request for pipe type is to be placed in the PSE portion of the project file to serve as backup justification. The bid item will be the pipe type requested by the owner, and the general note on the structure note sheet will read either "no acceptable alternates" or "replace in kind", whichever is appropriate.

The General Notes will include information required to complete the data for a particular drainage feature, such as:

1. Acceptable or unacceptable pipe alternates for drain, underdrain, and culvert pipes.

2. Unacceptable alternates for culvert and storm sewer pipes bid on a schedule basis.

3. The appropriate treatment for pipes, except when the treatment is described by the bid item name.

4. The corrugation dimension for corrugated steel pipe when other than the standard size corrugation is required.

5. Specific vertical elongation where elliptical shaped steel or aluminum pipes are required, whether the elliptical pipe is specified in the bid item or as an alternate.

6. Procedures or instructions necessary to complete construction of the drainage feature.

7. To indicate locations where features, such as beveled end sections, safety bars, etc., are required.

8. When making a reference in the General Notes to a detail in the contract plans DO NOT use the statement "FOR DETAIL SEE PLANS". Identify the exact plan sheet (using the Plan Reference No.) where the detail is located.

9. When making a reference to the Standard Plans, give the full Standard Plan number.

10. When making a reference in the General Notes to a special provision in the contract, DO NOT use the statement "SEE SPECIAL PROVISIONS". Identify the special provision exactly by name.

The bid item totals on the Structure Note sheets must be consistent with the bid item totals entered in the Estimate.

If the quantities for an item appear on other plan sheets, in addition to the structure note sheets, cross-references shall be made to the sheets where the additional quantities can be found.

460.13 Drainage Plan

- See Example 4-22.

Each plan sheet will have its own consecutive series of numbers identifying drainage features (numbers beginning with number 1 enclosed in circles) beginning in the top left corner of the sheet and progressing across and down the sheet. A light, arrowless line will be drawn from the circle to the drainage feature or features. These numbers relate directly back to the Structure Notes plan sheets.

When a drainage feature is continued on more than one sheet, the circle will be divided with a horizontal line, and the plan sheet reference number on which the drainage feature first appears will be inserted in the upper half and the individual identifying number will be inserted in the lower half. A larger scale circle may be used if this is done. The circle symbol is reserved for the purpose of identifying drainage features and is not to be used for any other purpose.

If a sanitary or storm sewer line stationing is used, the plan sheets will indicate the appropriate ties to the construction center line.

Each cross pipe will have a separate code number, which will include any attached drainage structure, and any riprap, quarry spalls, or other end treatment being constructed in conjunction with the pipe.

Each run of pipe in a closed sewer system will have a separate code number which will include the pipe and the drainage structure on the inlet end of the run of pipe.

If multiple pipes are to be placed in the same trench, they may be combined under a single structure code.

The skew angle for all skewed cross pipes shall be indicated on the plan sheets, unless both ends are controlled by station and offset and the stations and offsets appear on the structure note sheet.

A roadway ditch that is shown as part of a roadway section does not need to be shown on the drainage plans. This roadway ditch is included in the earthwork items as part of the bid items for Roadway Excavation Incl. Haul. This roadway ditch shall not be assigned a structure note number. When a ditch is constructed based on a drainage profile in the drainage plans, then this ditch shall be assigned

a structure note number and the excavation is included in the bid item, Ditch Excavation.

460.14 Drainage Profiles

- See Example 4-23.

The established scale controls the drainage profiles vertically. There is usually no horizontal scale for the drainage profiles, but it is recommended that distances represented be drawn proportionately. Each profile will be drawn in proportion horizontally for the length of the profile (the space representing 10 feet will appear the same for the length of the profile, and it will appear to be approximately 2 times a space representing 5 feet).

The profiles can be made visually easier to follow by using an elongated triangle to represent manholes and a elongated rectangle to represent other drainage structures (catch basins, inlets, etc.)

The distance shown between drainage structures is not the length of pipe, but the horizontal distance from center of structure to center of structure. If it happens to appear to be the same as the length of pipe shown in the Structure Notes Plan Sheet it is merely coincidental.

Pipe diameters are to be drawn with proportionate scale, so a 12- inch diameter pipe will be drawn half the size of a 24- inch diameter pipe.

The drainage profiles are to be drawn as a straight line representation of the path the water will take as it flows through the system, without regard for the actual plan view direction the pipes are running. The designer does not have to break the profile because a system that had been running parallel to the center line has turned ninety degrees at a catch basin and crossed the roadway.

At locations where two or more pipes bring water to a drainage structure and one pipe carries the water away, there will have to be breaks in the profiles. One profile will continue through the common drainage structure and show the water leaving the structure, while the other profiles will stop or start at the common structure. There will be a leader line drawn between the representations of the common drainage structure with the note "same catch basin", which is the tie between the profiles and completes each without having to draw the exit pipe a number of times. The information for the common structure will only be shown on one profile, usually the one that shows the outlet pipe.

The following information is to appear on the drainage profiles:

1. Inlet and outlet flow line elevations of pipes (shown below the pipe profile).

2. Outflow treatments such as riprap, quarry spalls, and, if the ditch is other than a roadway or median ditch, ditch profiles.

3. Debris deflectors, standpipes and headwalls.

4. The type of drainage structure, and station and offset location of the structure (shown above the structure).

5. The rim elevation of manholes, catch basins, inlets, or other drainage structures (shown above the structure).

6. The horizontal distance between adjacent drainage structures from center of structure to center of structure.

7. The size of pipe in each run (do not have to include the type of pipe).

8. The pipe slope (carried out to sufficient decimal places so that when the calculation is made from the indicated inlet flow line, on the given grade, for the given distance, the result will be the outlet flow line indicated).

9. Finished ground line above the pipe.

10. Original ground line if pipes will be placed prior to embankment construction or if original ground differs from the finished ground line.

460.15 Utility Plan

- See Example 4-19.

When the contractor is to work on the existing utilities as part of the contract, plan sheets for utility structure notes, plans and details will be required. These sheets shall follow the same general guidelines as specified for drainage structure notes, plans, and details.

RCW 19.122.040 (Revised Code of Washington) requires WSDOT to identify and locate known underground utilities in our contracts. The designer should make every effort to identify and locate above ground utilities also. The RCW is as follows:

> RCW 19.122.040 Underground facilities identified in bid or contract--Excavator's duty of reasonable care--Liability for damages--Attorneys' fees.
>
> (1) Project owners shall indicate in bid or contract documents the existence of underground facilities known by the project owner to be located within the proposed area of excavation. The following shall be deemed changed or differing site conditions:
>
> (a) An underground facility not identified as required by this chapter or other provision of law; and
> (b) An underground facility not located, as required by this chapter or other provision of law, by the project owner or excavator if the project owner or excavator is also a utility.
>
> (2) An excavator shall use reasonable care to avoid damaging underground facilities. An excavator shall:
>
> (a) Determine the precise location of underground facilities which have been marked;
> (b) Plan the excavation to avoid damage to or minimize interference with underground facilities in and near the excavation area; and
> (c Provide such support for underground facilities in and near the construction area, including during backfill operations, as may be reasonably necessary for the protection of such facilities.
>
> (3) If an underground facility is damaged and such damage is the consequence of the failure to fulfill an obligation under this chapter, the party failing to perform that obligation shall be liable for any damages. Any clause in an excavation contract which attempts to allocate liability, or requires indemnification to shift the economic consequences of liability, different from the provisions of this chapter is against public policy and unenforceable. Nothing in this chapter prevents the parties to an excavation contract from contracting with respect to the allocation of risk for changed or differing site conditions.

(4) In any action brought under this section, the prevailing party is entitled to reasonable attorneys' fees.

[1984 c 144 § 4.]

Identified utilities are to be shown in the bid or contract documents as stated in the RCW. The site preparation series of plans is where they would normally be shown. See Section 460.10. If the project is in an area with lots of utilities, as well as lots of other topographical features, it may be necessary to separate the utilities on a separate series of plans following the site preparation series. The best available information as to the location of underground and overhead utilities is to be used. Example 4-19 shows how utilities are typically shown on a plan sheet.

Do not forget to include WSDOT utilities, such as traffic signal, illumination, and ITS conduits and fixtures.

The required amount of detail related to utility location is directly proportional to the amount of underground work involved in the contract and the proximity to the utility. A simple paver should require less utility detail than a project with excavation at or near a 24 inch natural gas line or a 96 inch sewer line.

460.16 Interchange Contour Plan

Provides finished ground contours for interchange areas. These plans require the region Landscape Architect's or the Headquarters Landscape Architect's (for Regions without a Landscape Architect) stamp, regardless of whether they are prepared by the design office or the landscape section. See Chapter 1310 of the Design Manual.

460.17 Paving/Pavement Marking Plan

- See Examples 4-24, 4-25, 4-26, 4-27, and 4-28.

Paving and pavement marking information will normally be combined on a single series of plans.

If the project requires the paving information to be separate from the pavement marking information, the paving plan will show the total roadway and shoulder widths described by the roadway sections, not lane widths. The pavement marking plans will show the lane configuration and widths. The information is not to be repeated on both series of plans.

The paving/pavement marking plan series is required when the work cannot be shown adequately on the roadway sections. If the roadway sections adequately describe most of the project, only the areas requiring more detailed or specific information need be shown in paving/pavement marking plans.

Pavement marking will conform to the requirements shown in the Design Manual, and the pavement marking applications shown in the Standard Plans. Pavement marking layout information is not required in the plans if the required pavement markings are as shown on the Standard Plans. Pavement marking quantities are to be tabulated on Quantity Tabulation sheets.

When paving/ pavement marking plans are included, they will show all lane and shoulder widths, information on pavement taper lengths and widths, widening for guardrail, as well as the locations of concrete barrier, guardrail, impact attenuators, and traffic islands. The various areas and types of pavement marking will be identified by quantity tabulation note, or, if there is only minor pavement marking, the beginning and ending stations could be shown on the plan for each type in the area.

The only existing information that will appear on the paving/ pavement marking plans will be

the existing roadways and approaches beyond the point where the new construction begins or ends to show the tie between the new and existing. The "old" roadway and lane lines through the construction area are not to be shown.

If there is only minor drainage, signing, or illumination work on the project, this minor work can be shown on the paving/pavement marking plans, provided it does not compromise the clarity of the paving and pavement marking information being shown.

Paving or pavement marking details, such as the layout of a traffic island, may be required at a larger scale to provide sufficient information or required dimensioning to clearly show the construction. These details will follow immediately after the paving/pavement marking series of plans.

460.18 Wetlands, Mitigation Sites and Detention/Retention Site Plans

Wetlands

All wetlands, whether inside of the right of way or not, that ***could be*** impacted by the construction work shall be shown on the construction plans, using standard symbols.

Wetlands may be either delineated or inventoried. Delineated wetlands will, in most cases, have buffer zones associated with them, which must also be shown on the plans. The buffer zone is established by the local jurisdiction, and may not always be identified on the permit. For each wetland identified within a project area, the designer will have to check with the regional environmental office to get the buffer zone information. Inventoried wetlands have been identified by a visual survey of the area and the required buffer zones are included in the inventoried boundaries.

The wetland and buffer zone shown on the plans is to represent the area, but does not have to be plotted point for point from the delineation information in the permit. The station and offset information required to delineate the site is not to be included in the contract plans. When the wetland is being surveyed, the information is to be taken directly from the permit.

The wetlands are to be shown on the vicinity map and all other plan sheets, such as those showing cut/fill lines, drainage, or other features that could impact them.

Mitigation Sites

A wetland mitigation site is a wetland area which has been, or is being created, restored, enhanced, or preserved to compensate for wetlands impacted by construction.

All wetland mitigation sites shall be shown on the construction plans, and identified as either "existing" or "to be constructed". A mitigation site, whether existing or to be constructed, is always identified as a mitigation site on plan sheets. Mitigation sites do not get re-classified as a wetland at a future time.

If a contractor is allowed to work within an existing wetland, wetland buffer zone, or, in rare circumstances, a mitigation site, the allowable work area shall be delineated by the cut and fill line. The contractor shall possess a permit identifying each wetland in which work is allowed.

Retention/Detention Sites

All facilities related to the detention, retention, and treatment, filtration, or drainage of stormwater or surface water, whether existing or to be constructed shall be shown on the construction plans and labeled as Stormwater Treatment Areas. It is important to identify stormwater treatment areas so they will not be misconstrued to be wetlands or mitigation areas in the future.

460.19 Plan Detail Sheet

Details, specific to the project being developed, will have to be provided by the designer to ensure the contractor has a clear picture of the work that is to be performed.

The plan details are to be organized on plan sheets so that they are grouped according to plan series. The detail sheets will then be placed as the last set of plans in the plan series. For example, all of the drainage details will be grouped on the appropriate number of sheets, and will become the last sheets in the drainage plan series (normally following the drainage profiles).

It is important the details be complete, meaningful, and necessary. It is also important that details be drawn at a scale that will clearly show the information when reduced and placed on the 11-inch by 17-inch plan sheets.

Plan details are not to be a redrawn Standard Plan. Many times, however, it is necessary to draw details showing a project specific modification to a Standard Plan. In these instances, sufficient detail is to be provided to indicate the modification, but all of the information on the Standard Plan that is still applicable is not to be redrawn. Instead, a note stating "FOR INFORMATION NOT SHOWN, SEE STANDARD PLAN X-XX" is to be included on the detail.

Details that are not associated with a Standard Plan must be complete, because the contractor is only obligated to provide what is shown on the detail.

Division 5 contains the STATE.CEL library, which is a number of generic or standard details, found in the CADD system. Many of these details can be used as is, or may be modified to fit requirements for a specific application. Use of these details can save both the designer and the CADD operator considerable time over developing and inputting details from scratch.

460.20 Minor Structures (non-structural retaining walls, etc.)

Projects with quantities for minor structures such as non-structural retaining walls (Standard Specification Section 8-24) or other like items of work shall have these quantities shown in the plans in one of the two methods as follows:

1. Quantities shall be shown on Quantity Tabulation Plan sheet(s).

2. Quantities shall be shown in tabular form (in data boxes) on the individual structure plan sheet(s).

460.21 Illumination Plan

- See Example 4-29.

The design of the illumination systems will conform to the guidelines in the Design Manual.

If the illumination work is minor adjustments to an existing system, or the installation of a small system (one or two luminaires) at an intersection, it can many times be shown on another series of plans.

The following information is required for illumination plans:

1. The location of light standards (new and existing).

2. The light standard number for new luminaires.

3. The location of the power source (whether new or existing).

4. The layout of the conduit and electrical circuitry.

5. The mounting height for new luminaires (for existing if being relocated).

6. The mast arm length for new luminaries (for existing if being relocated).

7. Base requirements, fixed or slip, for new luminaires (for existing if being relocated).

8. Conduit size and fill for new installation (for existing affected by, or affecting, the project).

9. Service cabinet requirements for new (or modifications to existing).

10. Junction box locations and types for new (for existing affected by, or affecting, the project) .

11. Luminaire light source, distribution, and voltage for new luminaires.

12. All other features peculiar to the specific project.

Stationing and offsets, shown in the foundation schedule for light standard locations, are to be reasonably accurate to ensure that the design light levels are achieved.

460.22 Traffic Signal Plan

Traffic signal plans are normally provided by either the region traffic office, or the Headquarters Traffic Design Office, and the designer simply incorporates them into the project. The traffic signal plans will follow the guidelines in the Design Manual.

460.23 Intelligent Transportation System Plan

The region traffic office normally provides intelligent transportation systems (ITS) plans, and the designer simply incorporates them into the project. The ITS plans will follow the guidelines in the Design Manual.

Even though the designer is not responsible for the design of the intelligent transportation system, the designer is responsible for providing the appropriate base maps to the traffic design office. The base map information provided to the traffic designer will show the locations of all new and existing features, such as utilities, drainage pipes and structures, so that these features can be taken into account during the initial design. It is also the designers' responsibility to keep the traffic designer aware of all design revisions made to the plans from the time that the initial layout was given to the traffic designer.

460.24 Sign Specification Sheet

- See Examples 4-30, 4-31 and 4-32.

Sign specification sheets are to be prepared on 11-inch by 17-inch paper sheets plotted from CADD or an Excel program.

A separate sign specification sheet will normally be prepared for the installation of new signs, the removal of signs, and the relocation of signs. If the signing work is minor, it is permissible to combine the different types of work on a single sheet, but there should be a distinct, identifiable section of the sheet for each type of work presented.

There will be a separate plan sign numbering system for each of the three types of signing work, and each will be continuous from the beginning of the project to the end.

The sign specification sheets are to be completely filled out.

Remember that the material stock used for the signs comes in 48 inch by 96 inch sheets, so sign sizes need to be adjusted to make the most efficient use of the stock material, the following guidelines should be used:

1. For signs having a horizontal dimension of 48 inches or less, all dimensions shall be specified in inches.

2. For signs having a horizontal dimension of greater than 48 inches, all dimensions shall be specified in feet and inches.

Wood posts can be called out as 4 x 4, 4 x 6, etc., as long as there is no reference to inches. Calling for a 4 x 4 is using the common name for a piece of lumber that is 3-1/2" x 3-1/2".

When a sign installation requires multiple steel posts, the designer will have to specify which base type found on Standard Plan G-8a, Type 1,

2A or 2B, is required for each multiple post installation.

460.25 Signing Plan

- See Examples 4-33 and 4-34.

The signing plans will follow the guidelines included in the Design Manual.

Signing will always be shown in a plan view; however, the designer needs to assess the need for the signing plan series. In many cases, there are not sufficient signs to require a separate series of plans and the signing information can be combined with another series, such as the paving/pavement marking plan series, without affecting the clarity of the overall plan.

A great deal of roadway detail is not normally required for a signing plan. The center line and edge of the roadway is normally all that is required for two lane highways. For multi-lane highways, additional detail and roadway information may be required.

For region-wide signing projects, where an extensive area is covered, a smaller scale, even a strip map, can be used for directional sign placements. However, even in these instances, larger scale details may be required to show sign installations at intersections and other areas where there are numerous signs being installed in a small area.

There is never to be a light standard within 50 feet of the front of an overhead sign installation.

Signs will be located on the plans and identified using the plan sign number. For new installations, the plan sign number will be enclosed in an oval. The plan sign number for sign removals will be enclosed in a rectangle and the number will be preceded by "R-". Sign relocations will show both the original and relocated locations of the sign and the plan sign number will be enclosed in a square. There will be a leader line from the plan sign number to the sign location. Sign relocations will have two leader lines: a dashed line from the plan sign number to the original location and a solid line from the plan sign number to the relocated location.

The signing plans will show the following:

1. Construction center lines (all that's required for destination and speed limit type signing.)

2. Basic roadway layout in areas where detail is required, such as intersections with considerable signing.

3. Sign locations.

4. Small scale layout of directional and special signs, showing required details, such as where upper and lower case lettering is to be used, location of directional arrows, etc. (details may be placed on a separate sheet to avoid overcrowding of the plan).

5. Small scale layout of standard control signs may be shown on the plans (this can be very helpful to both the contractor and the inspector).

6. The plan sign number with leader line pointing to sign location.

7. The WSDOT Sign Fabrication code number adjacent to plan sign number.

8. Signs to be installed.

9. Signs to be removed.

10. Signs to be relocated (show both the original, using a dashed leader line, and relocated, using a solid leader line, locations for the sign).

11. Power source for all illuminated signs (if the source is coincidental to an illumination or traffic signal system and shown on those plans, a construction note referencing the sheet where the source is identified will suffice).

460.26 Signing Details

When overhead signs are being installed on a sign bridge or cantilever structure, the Sign Specification and/or the Sign Detail needs to show the following information:

1. Simple drawing of the new structure and signs.
2. Distance between signs.
3. Distance between signs and end supports or posts.
4. Location of overhead signs in relation to lanes.
5. Sign light spacing.
6. Maintenance walkway position.
7. Other data called for on the plans.

460.27 Bridge Plan

Bridge plans are prepared by the Headquarters Bridge and Structures Office. The designer may be required to provide field information for use by the Headquarters Bridge and Structures Office during the design. Required data and guidelines are shown in the Design Manual.

Most projects with bridge construction will have items of work required because of the bridge work, but are indicated on the bridge plans as "not included in bridge quantities". The designer is to provide the required PS&E information for these items.

Following is a list of the types of items that are typically "not included in bridge quantities":

1 Drains.
2 Gravel backfill for drain.
3 Gravel backfill for wall.
4. Underdrain pipe behind or around abutments or walls.
5 Drain pipe in embankments at bridge ends.
6 Utility conduits and anchorage.
7 Slope protection.
8. Concrete barrier.
9. Guardrail connections.

The bridge designer will provide the designer with a list of the items that are not included in the bridge work.

460.28 Traffic Control Plan

As required in the Federal Aid Policy Guide, Title 23 CFR, Chapter 1, Subchapter G Part 630, Subpart J, Section 630.1010(2), every project shall have project specific traffic control plans. "Traffic Control Plans" is the common name for site specific work zone traffic control plans. Primary consideration should be given to worker safety within the work zone while, at the same time, providing for the safe and efficient passage of traffic.

It is important for the designer of the traffic control plans to remember that when the contractor uses the traffic control layouts shown in the plans, WSDOT is in a high liability position should anything go wrong when the traffic control called for is in place. Because of the high liability, this portion of the plan needs to be developed with a great deal of thought, by someone with an understanding of the project, in addition to an understanding of traffic control requirements.

The size and color of all traffic control signs are to be shown on the plan. Warning (W series) signs are, required by WSDOT policy, to be a minimum of 48 inches by 48 inches, but this information still has to be on the plan. Traffic control signing is laid out in respect to the distance from the work area. These distances, from the work area and between signs, are to be shown as plus/minus distances. For example, if the required spacing between signs is 150 feet, it will appear on the plan sheet as 150'+/-. This does not mean the contractor can put the sign any place they want in the 150 footRange, it means the sign is to be placed at 150 feet, unless there is an engineering reason to move it slightly. See the Design Manual, Chapter 810,

for additional items to be included in these plans.

Tables have been developed for sign spacing, taper lengths, pavement marking device spacing, and buffer zone data, that establish criteria for a variety of speeds. It is recommended that these tables be utilized for consistency and to eliminate the possibility of errors in calculations.

The special provisions may allow the contractor to develop traffic control plans or revise those furnished, but, in either case, they cannot be used without approval of the Engineer.

Traffic control plans may contain certain required items, not supplied by WSDOT, for which bid items will be provided for in the project. The traffic control plans shall be reviewed to ensure that all items required for traffic control and bidding are shown as either separate bid items or included in bid items for a lump sum bid if approved by the proper delegated authority.

When the traffic control plans are prepared by the traffic office, the designer must work closely with the traffic office to ensure that the traffic control plans are compatible with the rest of the project and project staging. The traffic office, in many cases, is not as familiar with the entire project as the designer, so the designer should review the traffic control plans thoroughly.